# Claims

[1] 1. A folding and spreading system for a half spread folding door using as an entrance of a large structure such as a depot or an air shed, each door leaf being successively connected with a hinge means, and the door having a zigzag form in its fully open state, the folding and spreading system comprising:
an upper and a lower guiding means for making the folding door move in a close or open direction;
a first wire guider provided at the depth portion of each door leaf in a pre-determined distance from a neighboring first wire guider, and a second wire guider installed coaxially to the first wire guider;
a folding motor and a spreading motor provided at a free end frame and a fixed end frame of the folding door, respectively, and having a reel at each rotational shaft of each motor; and
a winding wire and a releasing wire extended diagonally through each of the first wire guider and the second wire guider of each door leaf, each end of the winding wire fixedly connected to the first wire guider of the free end leaf and to the winding reel of the folding motor, respectively, each end of the releasing wire fixedly connected to the second wire guider of the fixed end leaf and to the releasing reel of the spreading motor, respectively, in order to fold and spread the adjacent two door leaves around the hinge means.

[2] 2. The folding and spreading system for a half spread folding door according to claim 1, wherein:
the lower guider is comprised of a rail provided at the lower door frame and extended along a movement of the folding door, and multiple wheels provided rotationally at the lower end of the each door leaf and running on the rail.

[3] 3. The folding and spreading system for a half spread folding door according to claim 2, wherein:
the upper guider is comprised of a guide channel provided below the upper door frame and extended along a movement of the folding door, and multiple support pins uprightly extruded from the top end of each door leaf and slidingly inserted into the guide channel.

[4] 4. The folding and spreading system for a half spread folding door according to claim 3, wherein:
a motor running in the forward or reverse direction is further installed at the free end leaf of the folding door, the motor is connected to the wheel through a power delivery means, and the motor operates in synchronous with the folding motor and the spreading motor.

[5] 5. The folding and spreading system for a half spread folding door according to claim 4, wherein:
the motor is provided at an upper end of an upright shaft, and a wheel of the free end door leaf is provided at a lower end of the upright shaft, and the upright shaft is rotationally disposed at the free end door leaf.

[6] 6. The folding and spreading system for a half spread folding door according to claim 4, wherein:
a roller is rotationally coupled with the support pin and the roller slidingly moves in the guide channel.

[7] 7. The folding and spreading system for a half spread folding door according to claim 1, wherein:
a tension maintainable means is provided at a wire movement path, which pushes the winding wire and the releasing wire in order to maintain a proper tension of each wire.

[8] 8. The folding and spreading system for a half spread folding door according to claim 1, wherein:
a couple of wire guiders are installed at the top plan of each door leaf, or inside each door leaf.

[9] 9. The folding and spreading system for a half spread folding door according to claim 1, wherein:
a first wire guider is installed at the top plan of each door leaf, and a second wire guider is installed inside each door leaf.

[10] 10. The folding and spreading system for a half spread folding door according to claim 1, wherein:
a couple of wire guiders are comprised with a pulley rotationally provided at each door leaf.

[11] 11. A folding and spreading system for a half spread folding door using as an entrance of a large structure such as a depot or an air shed, each door leaf being successively connected with a hinge means, and the door having a zigzag form in its fully open state, the folding and spreading system comprising:
a guide channel for making the folding door move in a close or open direction;
an upper and a lower guiding means for making the folding door move in a horizontal direction;
multiple rollers protruded from a top plan of each door leaf and being slidingly run in the guide channel;
a rail provided at the lower door frame in a close or open direction of the folding door;
multiple wheels provided rotationally at the lower end of each door leaf and

running on the rail;

a first wire guider provided at the depth portion of each door leaf in a pre-determined distance from a neighboring first wire guider, and a second wire guider installed coaxially to the first wire guider;

a leading door connected with a hinge to the free end leaf, an upper end of the leading door being slidingly supported in the guide channel, and a lower end of the leading door having multiple wheels operated by a clockwise or counter-clockwise rotation motor, the wheels running along the guide channel;

a folding motor and a spreading motor provide at a free end frame and a fixed end frame of the folding door, respectively, and having a reel at each rotational shaft of each motor, and operating in synchronous with the rotation motor; and

a winding wire and a releasing wire extended diagonally through each of the first wire guider and the second wire guider of each door leaf, each end of the winding wire fixedly connected to the first wire guider of the free end leaf and to the winding reel of the folding motor, respectively, each end of the releasing wire fixedly connected to the second wire guider of the fixed end leaf and to the releasing reel of the spreading motor, respectively, in order to fold and spread the adjacent two door leaves around the hinge means.

[12] 12. The folding and spreading system for a half spread folding door according to claim 11, wherein:

the folding motor and the spreading motor are operated simultaneously, the folding motor runs earlier in a half wheel operation than the spreading motor.

[13] 13. The folding and spreading system for a half spread folding door according to claim 11, wherein:

a tension maintainable means is provided at a wire movement path, which pushes the winding wire and the releasing wire in order to maintain a proper tension of each wire.

[14] 14. The folding and spreading system for a half spread folding door according to claim 11, wherein:

a couple of wire guiders are installed at the top plan of each door leaf, or inside each door leaf.

[15] 15. The folding and spreading system for a half spread folding door according to claim 11, wherein:

a first wire guider is installed at the top plan of each door leaf, and a second wire guider is installed inside each door leaf.

[16] 16. The folding and spreading system for a half spread folding door according to claim 11, wherein:

a couple of wire guiders are comprised with a pulley rotationally provided at

each door leaf.

[17] 17. A folding and spreading system for a half spread folding door using as an entrance of a large structure such as a depot or an air shed, each door leaf being successively connected with a hinge means, and the door having a zigzag form in its fully open state, the folding and spreading system comprising:
a guide channel disposed at a fixed end frame and a free end frame facing to each other;
a guide roller protruded from each right and left end of each door leaf and sliding along in the corresponding guide channel;
multiple wire guiders provided at the depth portion of each door leaf in a pre-determined distance from a neighboring wire guider;
a clockwise or counterclockwise rotation motor provide at an upper door frame, and having a reel at a rotational shaft of the motor; and
a wire extended diagonally through the wire guiders, each end of the wire fixedly connected to the free end leaf and to the reel of the folding/spreading motor in order to fold and spread the adjacent two door leaves around the hinge means.

[18] 18. The folding and spreading system for a half spread folding door according to claim 17, wherein:
the wire guider is disposed at a middle portion of the door leaf, and is housed in the door leaf.

[19] 19. The folding and spreading system for a half spread folding door according to claim 17, wherein:
the wire guiders are arranged on the folding door in multiple columns, and the wire runs successively on the whole wire guiders in a form of a zigzag.

[20] 20. The folding and spreading system for a half spread folding door according to claim 17, wherein:
a couple of wire guiders are comprised with a pulley rotationally provided at each door leaf.

[21] 21. The folding and spreading system for a half spread folding door according to claim 11, wherein:
an end block acting as a weight is provided at the free end frame of the door.